

Basic track-laying, part two

By Colin McKinney

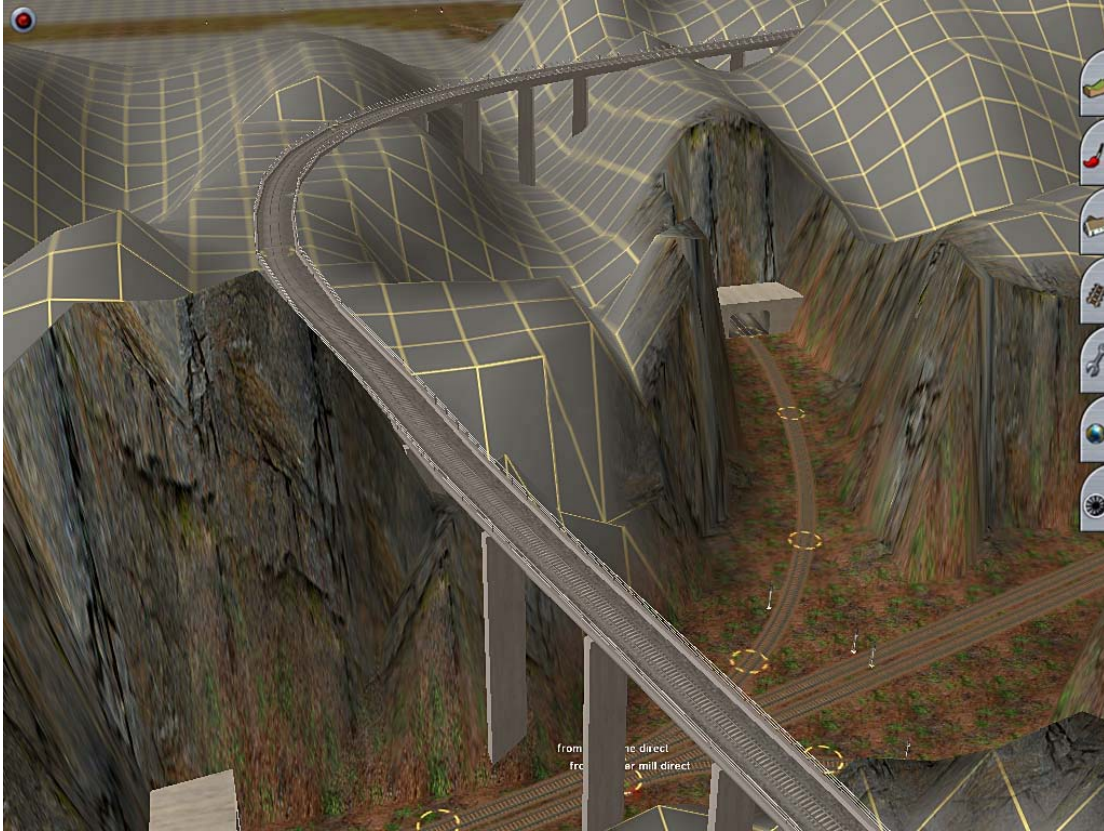


Figure 1: Screen shot from a 'work in progress'. Techniques covered in this tutorial will introduce you to skills for creating hills, valleys, bridges, cuttings, and tunnels.

Basic track-laying, part one was published in the July issue of *Virtual Railroader* and is also part of the *Basic Trainz* section at the [Virtual Railroader](http://www.virtualrailroader.com) web site. In this second part we enter the world of three dimensions and look at track-laying on embankments and through cuttings, up (or down!) inclines, over bridges, and through tunnels (see figure 1).

3-D: adding hills and valleys

Start with a blank section of baseboard. Open the top panel ('Topology') by clicking the tab or pressing F1. With the mouse pointer, turn the radius dial to about the '12 o'clock' position. Select the top left button ('Height up') and move the mouse to the baseboard. You will see a circle. Hold down the left mouse button briefly, and notice how a hill is created inside the circle. Now select the top middle button ('Height Down') – this time, the circle on the

baseboard creates a depression when you press the left mouse button (see figure 2).

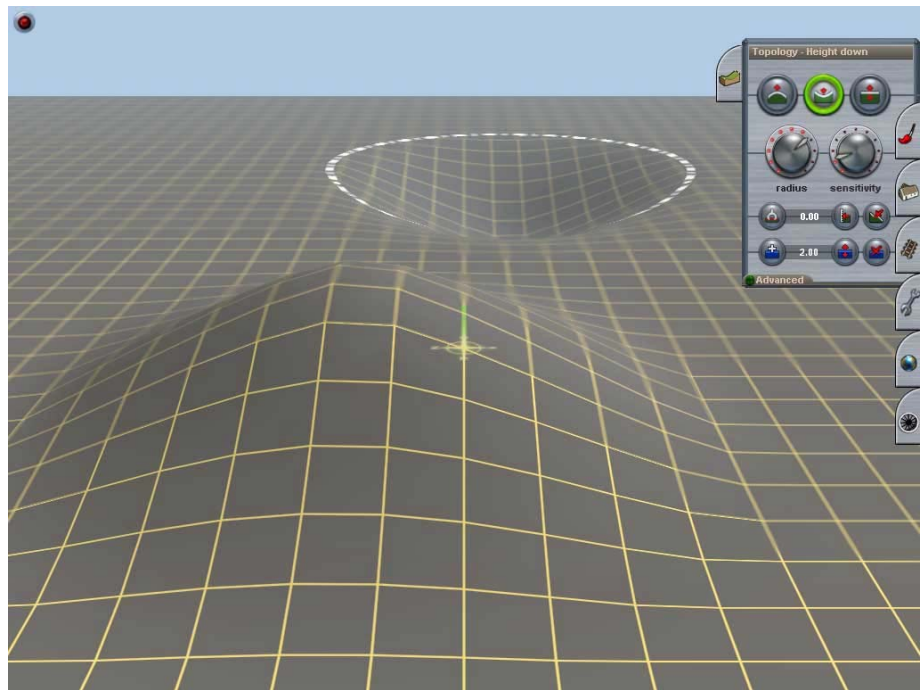


Figure 2: A hill and a depression created. The 'Height down' button is shown selected.

Close the Topology panel (click on the tab) and open the Tracks panel. Lay two lengths of track, right across both the hill and the depression (see figure 3).

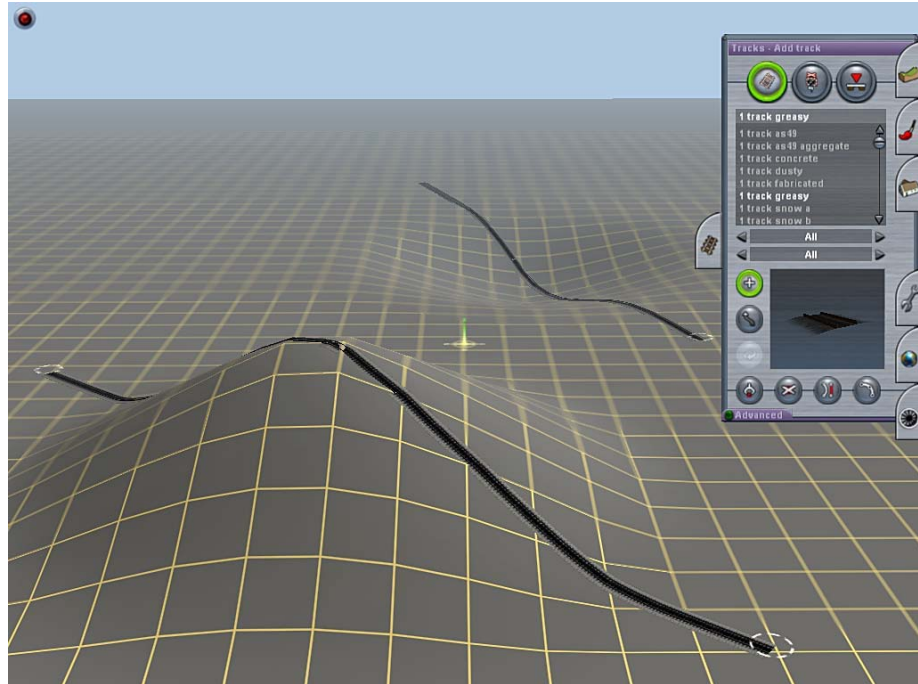


Figure 3: Impossible-looking tracks laid across the hill and depression.

Note: if your track was rigidly straight, passing over the depression like a bridge and straight through the hill, it won't affect anything in this tutorial. (It happened that way because of the setting for the 'fixed track vertex height' option in the Surveyor Options menu).

To make a cutting / embankment

On the Track panel, click on 'Advanced', then on the top right button of the drop-down extension, 'Smooth spline height'. Now click the mouse arrow on the two tracks you have made. The effect of this tool is to instantly create a cutting if the track previously went over a hill, or if the track went over a depression, this tool brings the ground up to create an embankment (see figure 4).

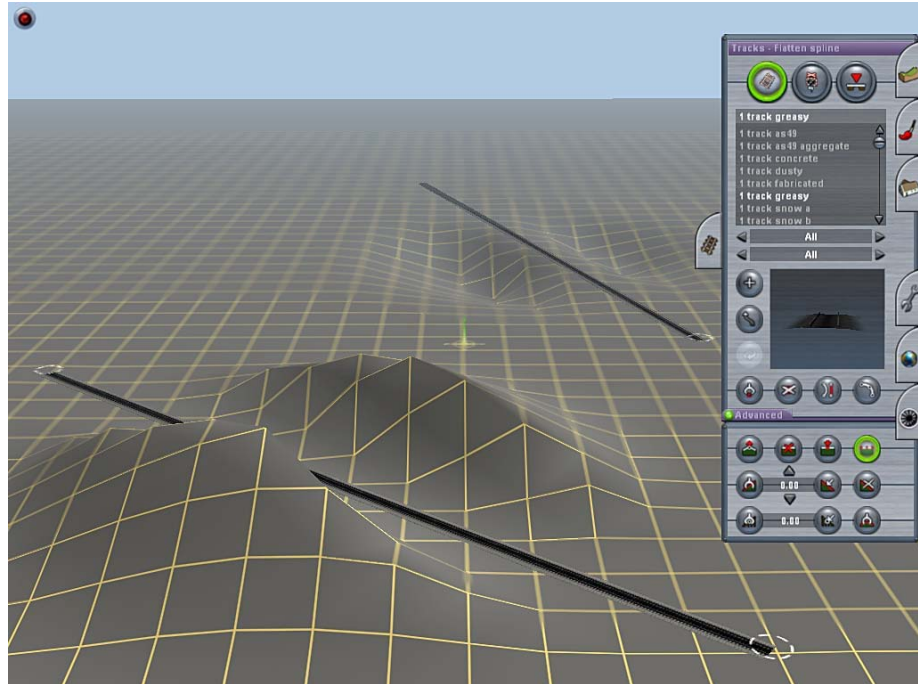


Figure 4: The tracks in the previous screen shot after 'Smooth spline height' has been applied.

To make a basic incline (gradient)

Starting once again from a flat baseboard, create (Topology panel) a bigger hill this time – in fact, let's call it a mountain – then lay a track (Track panel) from the base level to part way up the side of the mountain (see figure 5). Then, as before, click on the 'Advanced' button to reveal the drop-down extension then click on 'Smooth spline height' and then on the track. In a flash, you have a smooth incline from base level to where your track ended, hugging the side of the hill (see figure 6).

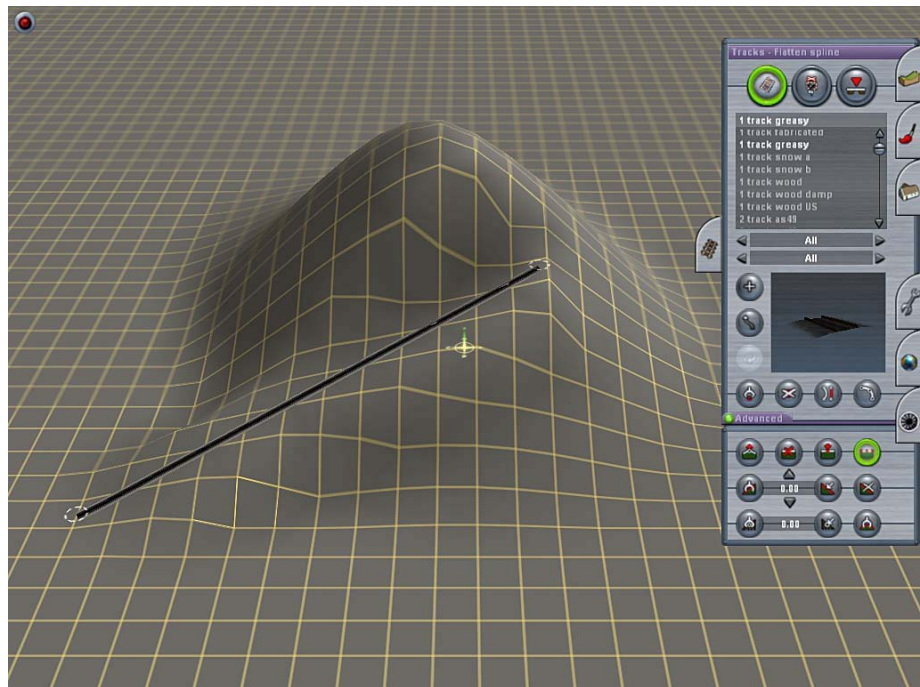
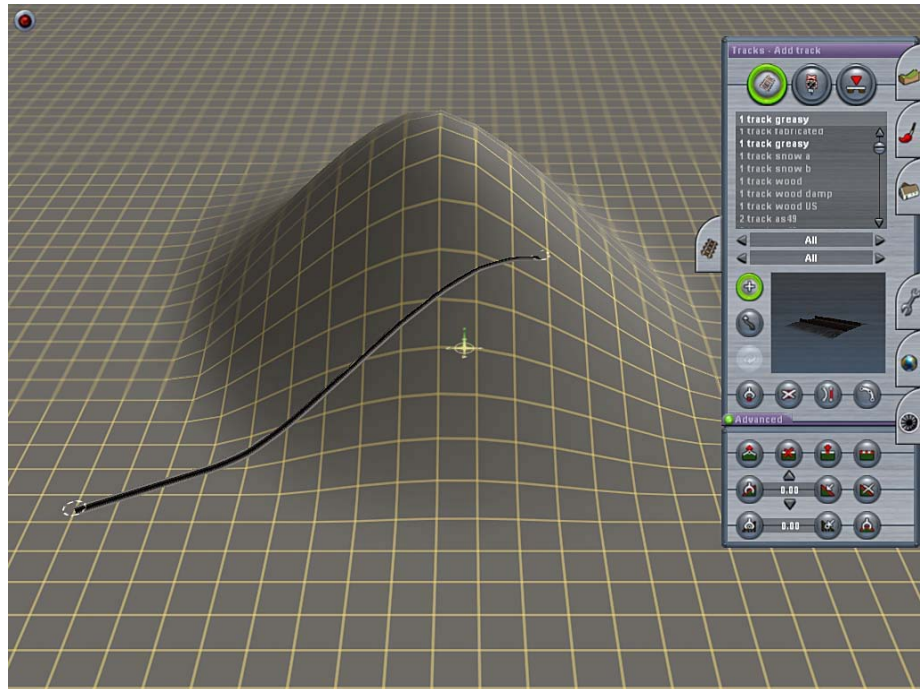


Figure 5 (above): Mountain with track from base level. Figure 6 (below): The same track as in the previous screen shot after 'Smooth spline height' has been applied.

Note: Surveyor contains another more mathematically precise system for building gradients, which is beyond the scope of this basic tutorial.

Building a bridge

Add another mountain (Topology panel) a short distance from the previous one, leaving a space between them (see figure 7). A bridge will be built across this gap.

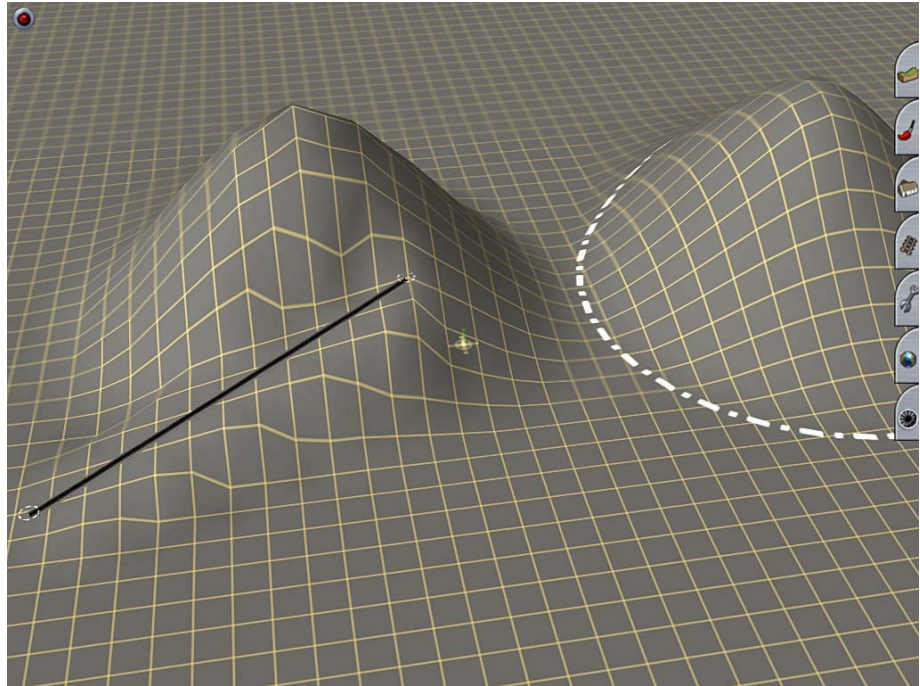


Figure 7: Another mountain added. The Topology panel has been closed for better visibility.

A bridge needs to be level. To achieve this, the height of the track on both sides of the gap has to be the same. In the Topology panel, click the button below the radius dial ('Get height'). The number in white figures to the right of this button represents the height of the compass in its present position. To move the compass to the end of the track, **right**-click the mouse until the compass is exactly on the end of the track. This may take a few attempts, because each time the compass is repositioned, the view of the layout changes. Zoom in ('Page Up' on the keyboard, or the mouse wheel if you have one) for greater accuracy. In the example, it can now be seen that the height of the track is 32.60 units (see figure 8).

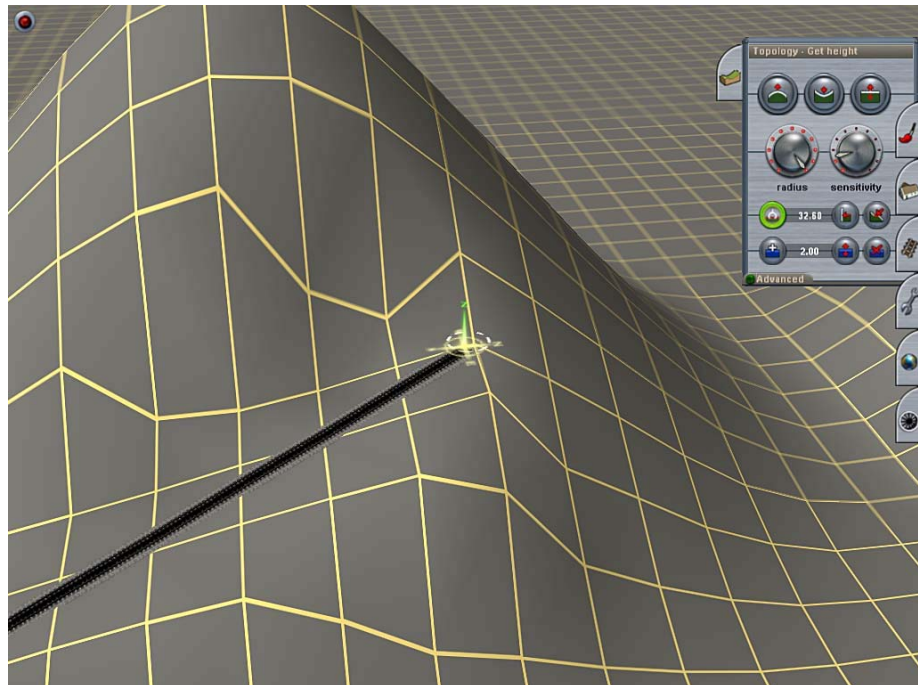


Figure 8: Getting the height of the track. The view is zoomed in for greater accuracy when positioning the compass.

Now (**left-**) click on the button in the Topology panel to the right of the 'Get height' button, on the other side of the figure indicating the height of the compass ('Use height'). The mouse position is indicated by a dotted circle: reduce the radius as far as possible by turning the 'Radius' dial anti-clockwise. On the mountain where the track ends, click the mouse arrow a short way beyond the track-end. The area being applied by this action is at the same height as the track-end. The reason for doing this will become apparent soon. (If a short section of track disappears, 'find' it by using 'Smooth spline height' on the Track panel again, then return to the Topology panel).

Zoom out again, and position the mouse pointer (not really a 'pointer', as it should still be showing a small circle because 'Use height' on the Topology panel is selected) on that part of the new mountain where you want the track to continue after the bridge is built. Press the left mouse button, and an area will be flattened that is at exactly the same height found earlier, when the 'Get height' button was first employed (see figure 9). In the example shown, this action created a small promontory. The Track panel was then opened, and some more track laid from this projection and away into the distance. 'Smooth spline height' has not yet been applied to this new section of track.

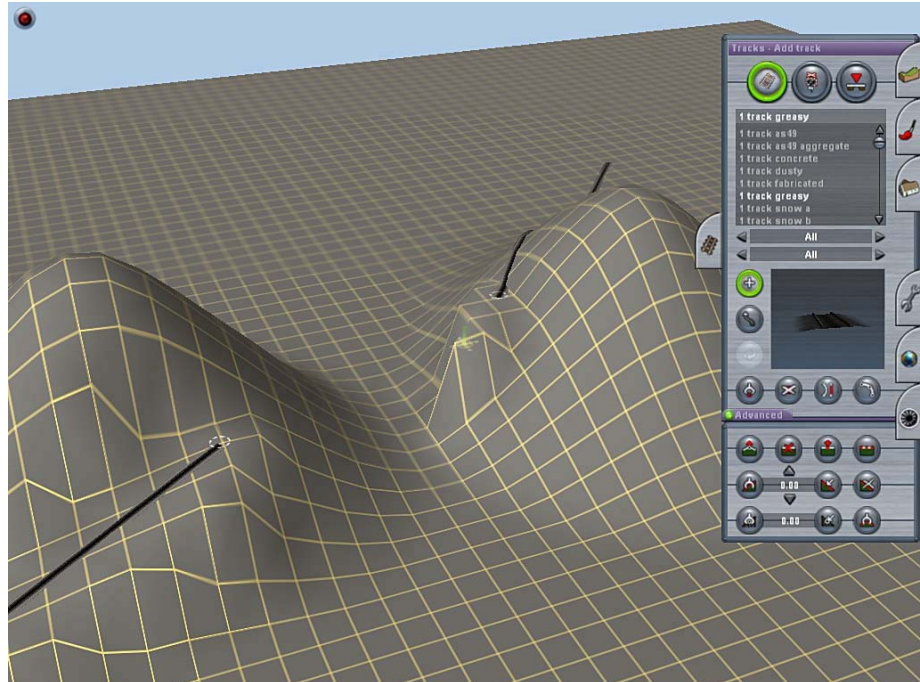


Figure 9: 'Use height' has been used to make a promontory on the second mountain, which is the same height as the end of the track on the first one. More track has been laid but 'Smooth spline height' has not yet been applied.

Open the Track panel and locate the arrow at the right-hand end of the strip just above the large 'Add track' button. This is indicated clearly in figure 10. Click this arrowhead once, and the choice of tracks in the main panel above changes from 'All' to 'Bridges'. Select the bridge you want to use. As with any choice in *Surveyor*, a small picture of your selection is indicated in the lower screen in the Track panel. In this example, the bridge chosen is 'UK Bridge Steel 1t concrete'. (1t means single track; 2t means double track). Make sure the 'Add track' button is selected, then in exactly the same way that you would lay track, extend the bridge from one track-end to the other (see figure 10).

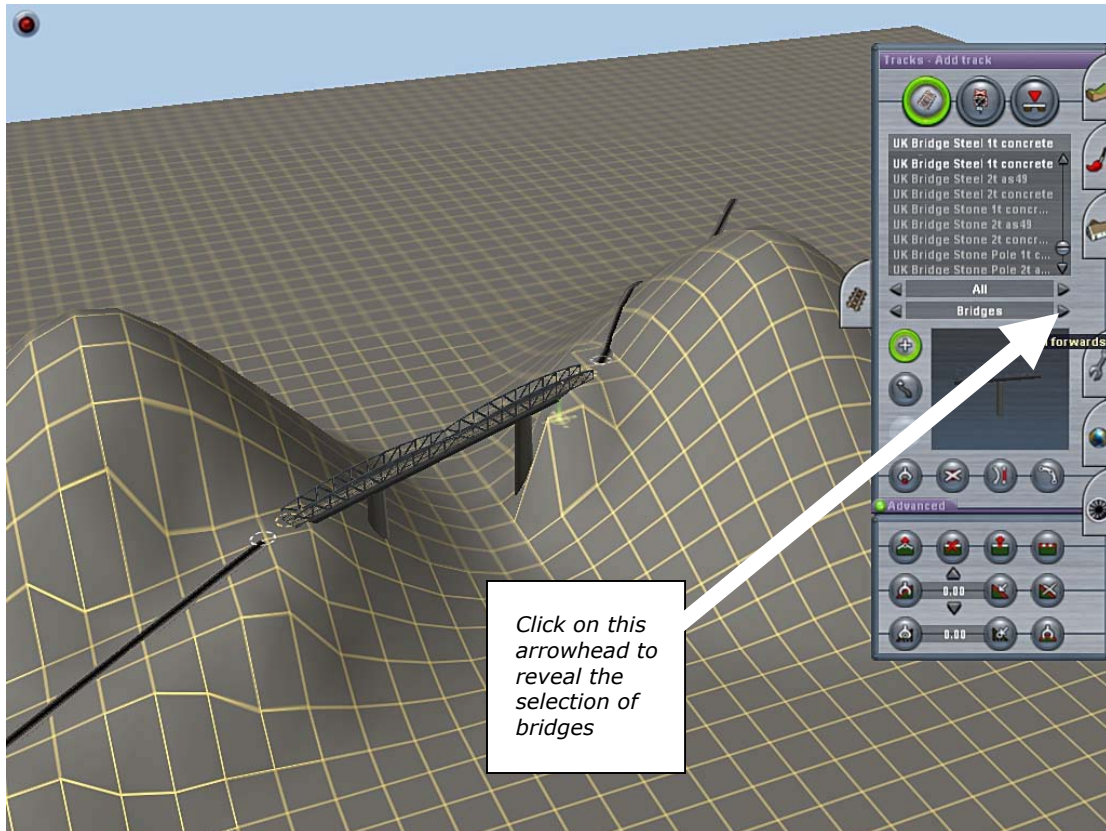


Figure 10: The bridge has been built! The arrow indicates where to change track options to 'Bridges'.

It's easier to join a track spline TO a bridge spline; don't try to do it the other way around. Select 'Move track' and move the white track-end splines and mouse-click them on to the yellow bridge splines. It may be necessary to change the perspective (i.e. use the keyboard arrow keys) to do this job properly. When the track joins the bridge, it will probably move out of its previous alignment, just as it does when you join ordinary track splines. That's why the **last** step is to use 'Smooth spline' to make all track visible (see figure 11).

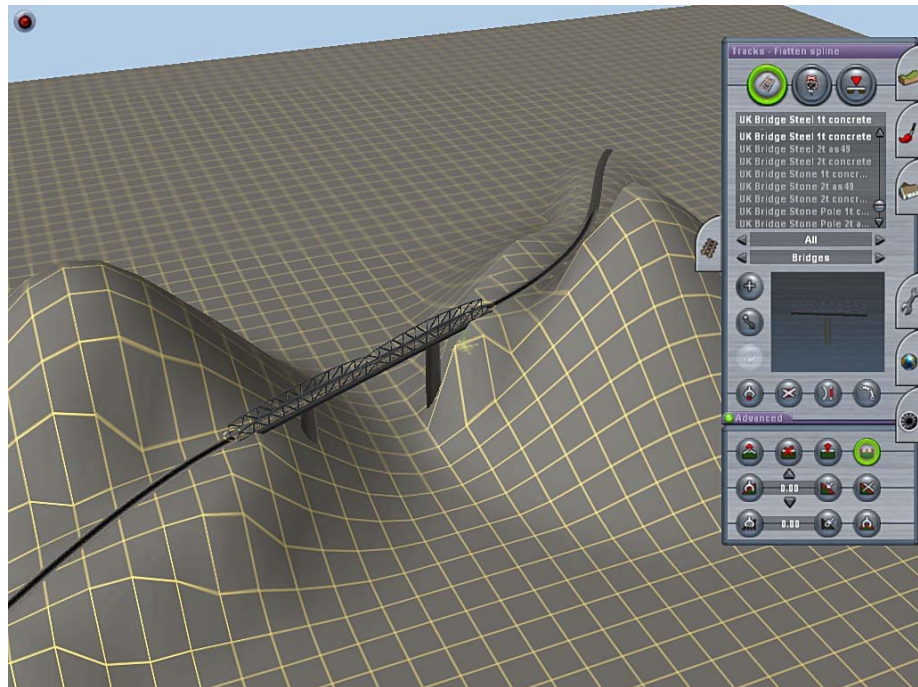


Figure 11: The final steps in the process: the track is joined to the bridge and 'Smooth spline' is applied.

Tunnels

If you can make a bridge, you can make a tunnel – in fact, it's easier, because you don't normally have to worry about equalising the height at either end, which is necessary for a bridge.

Make a hill, and lay some track TO one side of it and AWAY FROM the other side. In the Track panel, click the arrow at the right of the lower of the selection strips (where you earlier made the change from 'Tracks' to 'Bridges') until the selection of tunnels is reached (see figure 12).

Choose a tunnel style, then (making sure 'Add track' is selected) 'Stretch' the tunnel from one side of the hill to the other. Finally, join the track spline at each end to the tunnel spline. Sometimes a little fine tuning around the tunnel entrances is necessary, using the Topology panel (typically 'Height up') and, if necessary, 'Smooth spline' (Track panel, Advanced drop-down menu) to make track properly visible.

Hint: If, as sometimes is the case, you want to make a curve in a tunnel, the way to see what you are doing is to select 'Wireframe view' (see figure 13). Then you can add and move spline(s) as required to introduce the curvature you need. For detailed instructions about this operation, see 'Basic track-laying, part 1'.

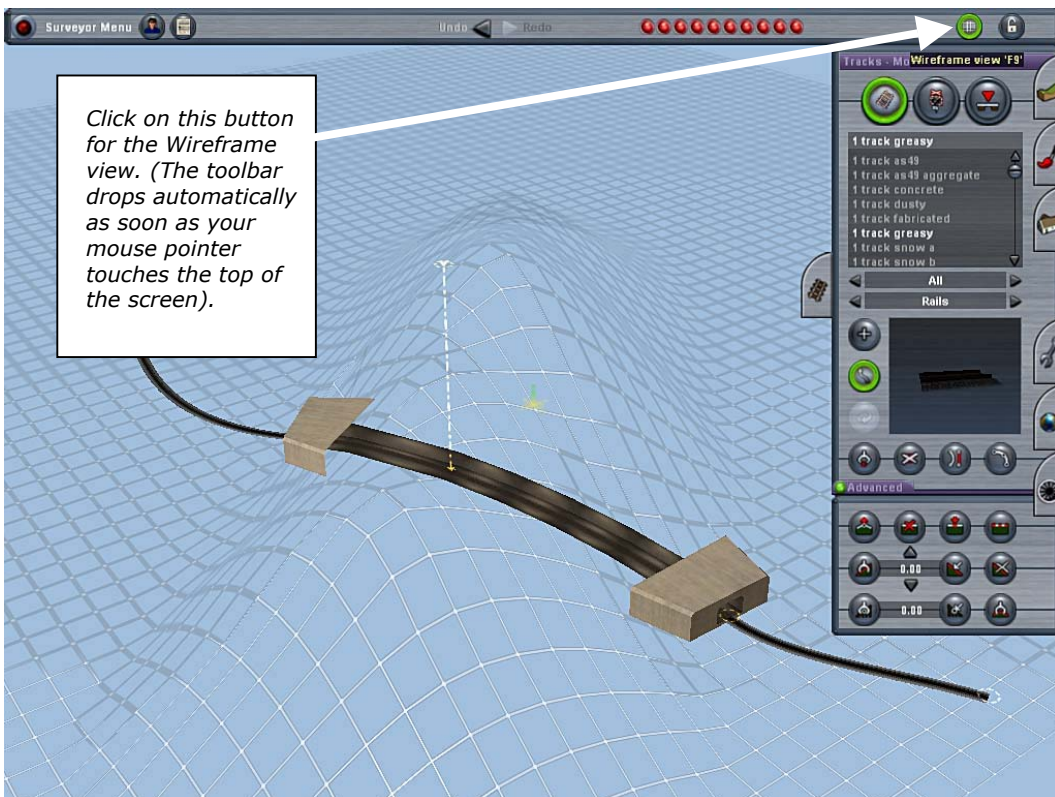
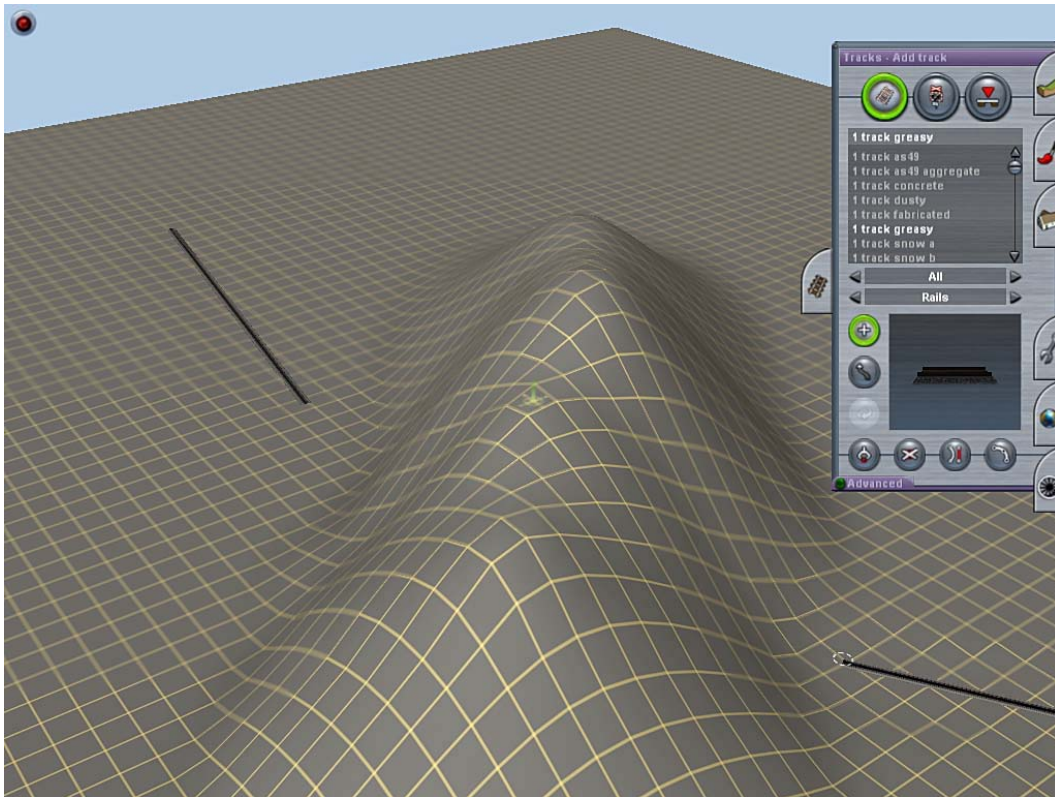


Figure 12 (above): Hill with tracks, ready for tunnel. Figure 13 (below): Wireframe view: tunnel curvature altered.

Final notes

These track-laying guidelines have been written with the beginner in mind, mainly because the Auran manuals can be confusing for the novice. However, the 'World Builder's Guide', which deals thoroughly with all aspects of *Surveyor Mode*, is an exception, being easier to follow than the others. If you haven't already discovered this manual, do so now: Start *Trainz*, but instead of clicking on the first item, 'Launch Trainz', click on 'Trainz Manual' then choose the second manual, 'World Builders Guide'. The best way to use this is to print it out and have a hard copy to refer to while you experiment with the finer points in *Surveyor*.

If you can't print out a manual, the next-best thing is to refer to it easily on-screen while you are using *Trainz*. If you are used to working with *Windows*, you are probably familiar with Alt+Tab, which allows you to toggle between open applications (programs). When you are working with *Trainz*, this feature seems to be unavailable. However, there is a way: while in *Trainz*, press the 'Windows' key (on most keyboards it's on the bottom left). This brings up the *Windows* Start menu, and you can now select and open the *Windows* program you want (e.g. the World Builder's Guide). After that, toggle using Alt+Tab as usual. (What should be the 'Trainz' logo will probably be a featureless rectangle, and the identifying label will read 'JET [Open GL]' or 'JET [Direct X9]', depending on how your system is configured).

Colin

Article and screen shots ©2004 Colin Mckinney. All rights reserved.